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Arduino Based Smart Parking System Using Tinker Cad

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ABSTRACT

Smart car parking System venture targets at analysing parking slots, supplying a confusion unfastened and easy parking. This project focuses on assisting the drivers of the vehicles to park their cars with minimum wastage of time with accurate facts of the availability of the parking slots. It consists of an ArduinoUno, the microcontroller unit to which LCD, item counters IC 555 and IC 4026 and ultrasonic sensors are interfaced. The LCD shows the supply of the gap, the counter keeps the test of the range of vehicles entering and exiting the parking space. The ultrasonic sensors discover the availability of the parking area. The overall interface is used to find the parking slot easily with minimal time consumption which saves the time, fuel of the car owner and helps in avoiding complicated traffic jams.

Keywords: Arduino Uno, tinker cad, IR sensors.

1. INTRODUCTION

Because of population explosion, especially in India and China as population is increasing concurrently variety of vehicles on road also increasing. Consequently, congestion is the primary problem in recent times, at some point of parking the vehicles finding available parking slot is a tedious process. As a consequence, to keep away from such hassle we are delivered with the smart parking system, that's capable of overcoming these troubles to a splendid extent. Smart car parking system is an automated, bendy, consumer pleasant and particularly green era because the booking of parking slot for the driver's car is made viable. Additionally, the operator can without difficulty hold the music of automobiles getting into and exiting the parking space.

2. HARDWARE AND SOFTWARE REQUIREMENTS

The components used in this project are-

- Tinker cad
- Arduino Uno
- LCD Screen
- IR Sensor
- Object Counter
- Servo Motor

a. ARDUINO MEGA

The Arduino mega is a microcontroller board primarily based on the atmega2560. It has fifty-four virtual input/output pins of which 15 can be used as

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PWM outputs, 16 analog inputs, 4 UARTS (hardware serial ports), a 16 MHZ crystal oscillator, a USB connection, a strength jack, an ICSP header, and a reset button. It includes the whole thing needed to support the microcontroller; truly connect it to a PC with a USB cable or strength it with an ac-to-dc adapter or battery to get started out.



Fig 1:Arduino mega

b.ARDUINO UNO

Arduino Uno a microcontroller board primarily based at the atmega328p. It has 14 digital input/output pins of which 6 can be used as PWM outputs and also has 6 analog inputs, a sixteen MHZ quartz crystal, a USB connection, an energy jack, an ICSP header and a reset button. It has been given wide variety of use and consumer friendly microcontroller. Really connect it to a computer with a USB cable or energy it with an ac-to-dc adapter or battery to get commenced.



Fig 2:ArduinoUno

c.TINKERCAD

Tinker cad is a loose 3-D modelling machine acknowledged for its ease of use. A hundred% internet-based totally, makes it on hand to absolutely everyone with a web connection. Youngsters, teachers, and hobbyists use it to design whatever you could consider. Using 3-d printing, laser slicing, or constructing blocks can carry tinker cad initiatives to real life.

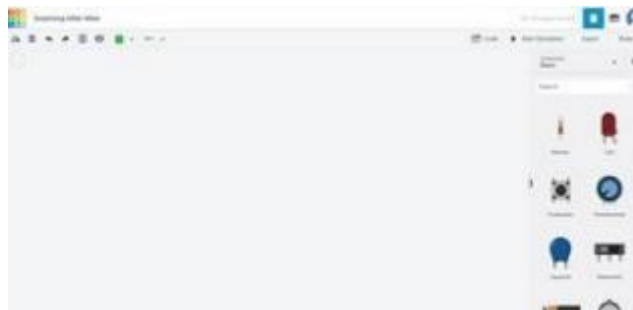


Fig 3: Tinker cad

d.LCD SCREEN

LCD screen is a flat-panel display, electronic visual display that uses the light modulating properties of liquid crystals and the liquid crystals do not emit light directly. LCDs are available to display arbitrary images. It displays pre-set words, digits, and 7-segment displays. It is applied in the devices like computer monitors, televisions, instrument panels, aircraft cockpit displays.



Fig 4: LCD display

e.IR SENSOR/Ultrasonic SENSOR

An infrared sensor is an electronic device, which emits infrared waves in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. As we know that usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, which can be detected by an infrared sensor. Its operating voltage is between 3V to 6V. Its operating range is 2cm to 30cm with an operating angle of 35°.



Fig 5: IR sensor

f.OBJECT COUNTER

The object counter is made up of two ICs: -

a) IC 555 in astable Mode IC 555 in astable Mode is used to generate clock pulses which will drive the IC CD 4026. IC 555 in astable mode is also called as free running oscillator. In astable mode, 555 timer is very simple, easy to design, low cost and very stable.

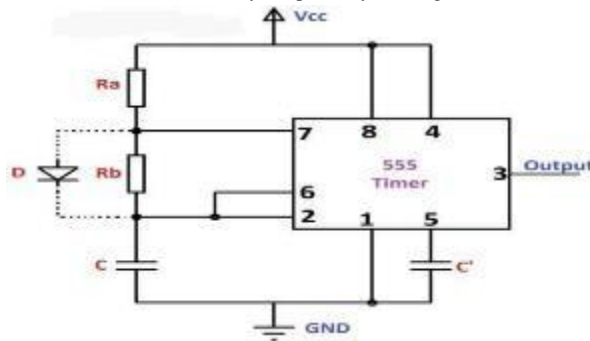


Fig 6: IC 555

b) IC CD 4026 IC CD 4026 is a CMOS decade counter with inbuilt decoder to display on seven segment display. It counts from 0-9 and displays the

numbers on the seven segment display. It increments the number on arrival of next clock pulse from IC 555.

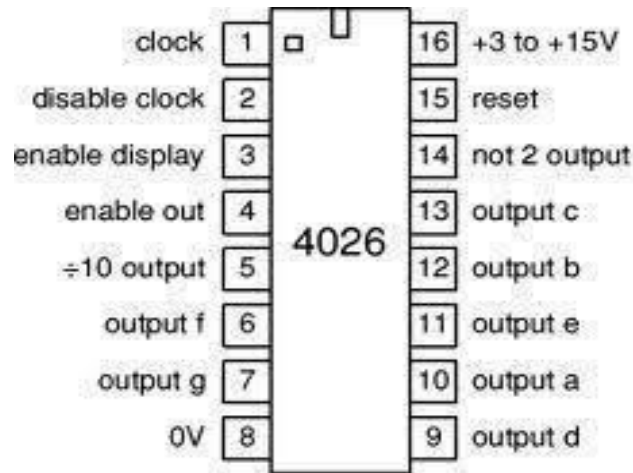


Fig 7: Seven segment display of IC 555

g.SERVO MOTOR

A servo motor is a self-contained electrical device, that rotate parts of a machine with high efficiency and with great accuracy. The output shaft of this motor can be moved to a particular angle, velocity and position that makes it fit for controlling gate.



Fig 8: Servo Motor

3. DESIGNING AND WORKING

The construction and working of the project is divided into three parts: -

1.Block Diagram

Whenever a vehicle enters the gate of parking area the Ultrasonic sensors senses the vehicle and LCD displays whether the parking slot is available or not. If the parking slot is available, the counter has a decrement in its value by 1 which further opens the gate of the parking area. After the opening of the gate the vehicle can be parked to one of the available slots. And if the slot is not available then a message will pop up saying that sorry, slot is not available.

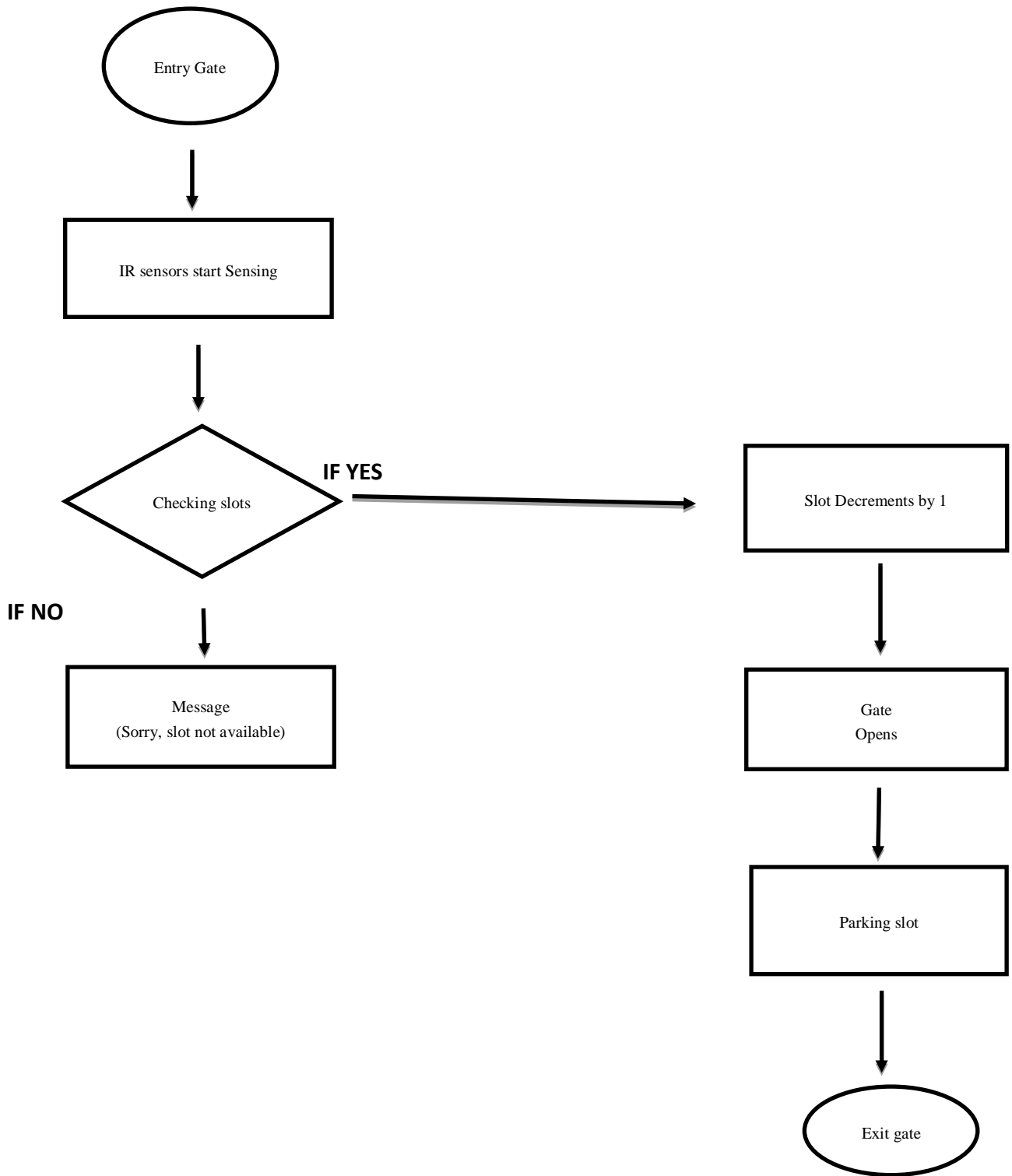


Fig 9: Block diagram of proposed system

1. Entry Part

The Entry Part of the project consists of Arduino microcontroller to which a, IR sensor, LCD are interfaced. As soon as the gate at the entrance opens and closes the IR sensor detects presence of car. The LCD displays the parking slots which are empty for the car drivers.

2. Parking Part

In the parking arena there are different slots available where drivers can park their car if the parking slots are vacant. It's area where numerous slots are available for the parking use.

3. Exit Part

The Exit Part of the project consists of Arduino Uno to which a, IR sensor and the object counter are interfaced. The gate at the entrance and it opens and closes when the IR sensor detects presence of car. The object counter circuit is designed using IC 555 and IC 4026 to count the number of cars exiting the parking space.

4. APPLICATION

- This proposed system can be used at various places such as hospitals, hotels, malls, monuments, buildings etc.
- Clever parking plays an essential function in growing higher urban surroundings with the aid of lowering the emission of CO₂.
- Affords equipment to optimize personnel management.
- Guides citizens and visitors to available parking spot
- Optimize parking space utilization
- Simplifies the parking level in and adds price for parking stakeholders, including merchants and drivers.
- Enables the free glide of visitors in the metropolis.

5. RESULT AND CONCLUSION

A final result has been obtained after process of coding into the Arduino program for clarification and identification had been done. As a result, the Ultrasonic sensors has been set to detect an object movement, the green point is locating the space or slots available. The LCD display reads Ultrasonic sensors, and display whether slot is available or not. As a conclusion, the Smart Car Parking System has improved the parking area. The new invention for this sector is a starting point to be developed in the country in future. This invention can also attract tourist to love the country by feeling the systematic shown by this system even though it's only a parking system. For this project, its benefit not only limited to this beloved country, India only. It also exposed the student about the basic skills of using Tinkercad software which is a digital simulation of Arduino system that is provided at official online website. Besides, this project give advantage to the driver which can avoid their vehicles from hit by another car or walls of indoor parking area. Also this aims to provide efficient way of parking for drivers without any hesitation. The cars entering and exiting the parking slots can be tracked with minimum errors. The problems which would arise while working with smart parking system as well as the solutions has been described which gives a good platform for all the users. With the implementation of smart parking system, it assures the ease of life for individuals who struggle in daily routines of their day to day life. The system that we propose provides real time information regarding availability of parking slots in a parking area. Finally, the objectives of this project are achieved and help many people including the students and party that are involved in this sector.

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